



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,061	12/22/2006	Yuichi Shibasaki	129526	6315
25944 7590 03/03/2010 OLIFF & BERRIDGE, PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850				
EXAMINER				
WHITESSELL GORDON, STEVEN H				
ART UNIT		PAPER NUMBER		
2882				
NOTIFICATION DATE		DELIVERY MODE		
03/03/2010		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

OfficeAction25944@oliff.com  
jarnstrong@oliff.com

### Office Action Summary

**Application No.**

10/594,061

**Applicant(s)**

SHIBAZAKI, YUICHI

**Examiner**

Steven H. Whitesell-Gordon

**Art Unit**

2882

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 and 38-63 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 38-63 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-576)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date 9/20/07, 10/5/07, 11/4/08

**DETAILED ACTION**

***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-4, 7-13, 38-42 and 45-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. [EP 1041357, cited by applicant] in view of Catey et al. [WO 02/29495] and Lof et al. [US 2004/0160582].**

For claims 1, 39, 53 and 61-63, Taniguchi teaches an exposure apparatus (see Figs. 1 and 2) that exposes a substrate (W) via a projection optical system (PL), the apparatus comprising: a substrate stage (WST) that can move with the substrate mounted (see [0062]); and a measurement section (14) that has a plate (measurement surface of 14). On which mirror-polishing is applied on at least one edge surface (surfaces 23X and 23Y measured by 15Y, 15X1 and 15X2, see Fig. 4).

Taniguchi does not disclose that the measurement section has a plate wherein the apparatus is configured so that at least a part including the plate that constitutes the measurement section can be exchanged.

Catey teaches the measurement section (102, see Figs. 1-4B) has a plate (104) wherein the apparatus is configured so that at least a part including the plate that constitutes the measurement section can be exchanged (exchanging the measurement section, see Figs. 2A-3D) and a detection unit that detects an exchange timing of the plate (controller not shown that controls removal and mounting of sensor apparatus 102 shown in Figs. 2A-3D and described in pages 9-10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the exchangeable measurement section with plate as taught by Catey in the measurement stage 14 as taught by Taniguchi, because, as taught by Catey in pages 2 and 3, an exchangeable measurement unit allows for automated placement and removal of specific sensors without special tooling or downtime.

Taniguchi as modified by Catey fails to disclose a liquid is supplied to a plate and performs measurement related to the exposure via the projection optical system and the liquid.

Lof teaches a liquid is supplied to a plate and performs measurement related to the exposure via the projection optical system and the liquid (measurement through liquids by sensor, see [0186]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the measurement of through liquid as taught by Lof in the apparatus as taught by Taniguchi in view of Catey, because as taught by Lof in [0011], liquids between the projection optics and substrate enable imaging of smaller

features, therefore, in order to provide for accurate measurement of exposure, the measurement should be through liquid.

**For claims 2 and 40,** In the combination of Taniguchi and Catey, Catey teaches a measurement section (102) consists of a measurement unit that has at least a part (portion attaching to stage assembly 112, see Fig. 2-2D) of the unit arranged on a part of the substrate stage (112 is wafer stage, see page 7 lines 27-29), and some of the components that include at least the plate that constitutes the measurement section unit is attached freely detachable to the substrate stage (see Fig. 3A-3D).

**For claims 3 and 41,** in the combination of Taniguchi and Catey, Taniguchi teaches the measurement section comprises a measurement stage main body (14) that can move within a two-dimensional plane independently from the substrate stage (see [0062]) and Catey teaches that the a measurement table main body that holds the plate (102 held by stage assembly 112, see Figs. 2A-2D).

**For claims 4 and 42,** in the combination of Taniguchi and Catey, Catey teaches the plate is held detachable from the measurement table main body (see Fig. 3A-3D).

**For claims 7 and 45,** Taniguchi teaches a self-weight compensation mechanism that compensates weight of the measurement table main body (weight compensated for because air bearing, see [0062]).

**For claims 8, 46 and 54,** Taniguchi teaches at least one fiducial mark (17B) and at least one pattern (slits 21X and 21Y on 20, see [0066]) used for measurement is formed on the plate, and the measurement section has a light-receiving system that

receives exposure light irradiated on the plate via the projection optical system, via the pattern used for measurement (see [0067]-[0069]).

**For claim 9, 47 and 55**, Taniguchi teaches a plurality of types of patterns used for measurement are formed on the plate (patterns formed by sensor shown on 14 in Fig. 2), and the measurement section has a plurality of the light-receiving systems that correspond to the pattern used for measurement (see [0067]-[0069]).

**For claims 10, 48 and 56**, Taniguchi teaches the plurality of types of patterns used for measurement include at least one of an aperture pattern used for aerial image measurement, a pinhole aperture pattern used for irregular illumination measurement, an aperture pattern used for illuminance measurement, and an aperture pattern used for wavefront aberration measurement (see [0066]-[0069]).

**For claims 12, 50 and 58**, Taniguchi teaches a control unit (10) that executes measurement by the measurement section according to exchange timing of a substrate on the substrate stage (see [0075]-[0080]).

**For claims 13, 51 and 59**, Taniguchi teaches the control unit executes measurement of specific types, dividing the measurement into a plurality of times according to the exchange timing of the substrate (see [0075]-[0080]).

**For claims 38, 52 and 60**, Taniguchi teaches a device manufacturing method that includes a lithography process in which a device pattern is transferred onto a substrate using the exposure apparatus (see [0001])

**For claims 11, 49 and 59**, Taniguchi teaches in a first embodiment (Figs. 1-4) a wafer table and measurement table. Taniguchi as modified by Catey and Lof does not

explicitly teach at least one substrate stage different from the substrate stage on which the substrate is mounted.

Taniguchi teaches in a second embodiment, Fig. 5, at least one substrate stage different from the substrate stage on which the substrate is mounted (two substrate tables shown in Fig. 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the second wafer table in the first embodiment of Taniguchi as modified by Catey and Lof, because two wafer stages reduces downtime lost to wafer exchange and increases throughput.

**4. Claims 5, 6, 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi in view of Catey and Lof as applied to claim 4 above, and further in view of Cuijpers et al. [US 6,573,161].**

**For claims 5, 6, 43 and 44,** Taniguchi implementation of a planar motor in [0063]. Taniguchi as modified by Catey and Lof fail to disclose a leveling table attached on the measurement stage main body, wherein the measurement table main body is supported finely movable on the leveling table, wherein the leveling table can be driven in directions of six degrees of freedom, and the measurement table main body can be driven in directions of three degrees of freedom within a horizontal plane.

Cuijpers teaches a leveling table (65, see Fig. 2 and 3) attached on the stage main body (positioning device 3), wherein the table main body (5) is supported finely movable on the leveling table (65), wherein the leveling table can be driven in directions of six degrees of freedom (see col. 7 lines 47-67), and the table main body can be

driven in directions of three degrees of freedom within a horizontal plane (see col. 7 lines 47-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made incorporate the positioning device Cuijpers in the measurement table and stage assembly as taught is the combination of Taniguchi, Catey and Lof, because this could allow for high precision movements of the measurement stage in order to increase the accuracy of the positioning of the measurement table under the projection system.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Whitesell-Gordon whose telephone number is (571) 270-3942. The examiner can normally be reached on Monday to Thursday, 9:00 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. H. W./  
Examiner, Art Unit 2882

/Hung Henry Nguyen/  
Primary Examiner of Art Unit 2882